FRACTURE OF THE TARSAL SCAPHOID BONE.

WITH REPORT OF THREE CASES.

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Fracture of the tarsal scaphoid bone is of infrequent occurrence. The standard text-books on fractures do not mention it, though Bloodgood, writing in Saunders' Medical Hand-atlas, recognizes fractures of the tarsal bones other than the astragalus and os calcis.

Prior to the advent of the Röntgen-rays, Kohlhardt[1] reported a case of fractured scaphoid. Later, Bahr[2] recognized luxations of the bone, and reported 7 cases. The accuracy of these diagnoses is considered doubtful by later writers. In 1905, Bergmann[3] described 3 cases, and proved his diagnosis skiagraphically.

The scaphoid bone, situated at the inner side of the tarsus, articulates behind with the astragalus, and in front with the three cuneiforms. The number of joints into which it enters, combined with the important position of the bone in the plantar arch, make injuries to it seriously disturb the integrity of the latter structure, and render the prognosis very guarded.

Fractures of this, as of the other tarsal bones, usually occur after falls from a height, the patient landing on the toes with the foot in plantar flexion. This indirect force transmitted from above presses the bone between the astragalus and cuneiforms, and tends to drive it forward. Owing to its bracing by the plantar ligaments, its close articulations, and its great dorso-plantar diameter, the bone is usually crushed before this takes place. Isolated dislocation has not been observed since cases began to be studied by the X-ray. With greater force the fragments slip forward under the tendons on the dorsum of the foot, and the astragalus is pushed into their place.

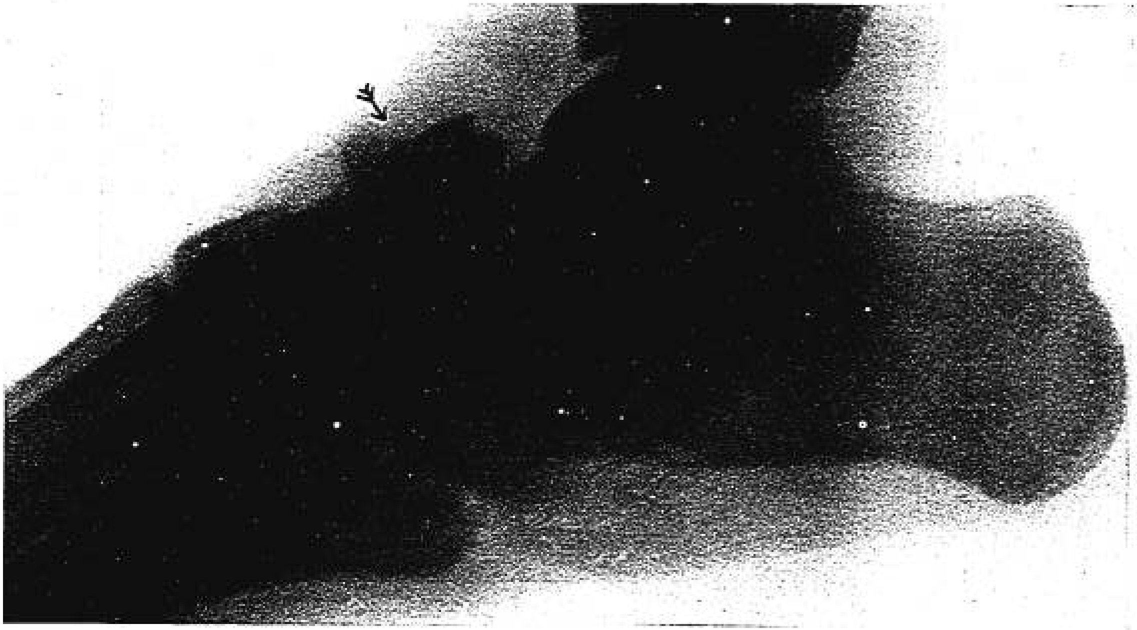
On physical examination, the foot is seen to be swollen and apparently broadened. Bergmann, in his three cases, found shortening of the inner edge of the foot, amounting to about 0.75 cm. Tenderness and crepitus can usually be elicited anterior to and a little below the malleoli. In cases with dislocation, the displaced fragments can be felt as a prominent knuckle on the dorsum of the foot. The usual clinical diagnosis is fracture of the astragalus.

The best method of diagnosis is by skiagraph, taken as usual for lateral views of the foot, with the external malleolus resting on the plate. A fair view of the bone can also be obtained in the antero-posterior direction. The principal line of fracture is found, as a rule, to follow the long axis of the bone, the two resulting fragments being further comminuted and displaced forward or inward, following the lines of least resistance. The normal foot should also be skiagraphed for comparison. The importance of this is illustrated by Momburg's[4] case. Disability was claimed one year after a slight injury. A skiagraph showed the scaphoid to consist of two pieces. There was, however, no effort at callus formation, and a control picture of the other foot showed a smaller piece in a similar location. The patient being overweight and showing in addition flattening of the arch, on both sides, the symptoms were ascribed to this and the indemnity was not granted. This whole question of supernumerary bones in the tarsus requires further investigation. Another example is seen in the so-called "os trigonum tarsi."

Treatment should aim first at the reduction of the fracture. For this Bergmann recommends the following technique: under ether the toes are grasped and extended, the foot flexed plantarward and abducted. This manœuver tends to increase the distance between the astragalus and the cuneiforms, and pressure on the dislocated fragments may now replace them. If the irregularities of the fragments make this impossible, Bloodgood[5] suggests an incision for reduction.

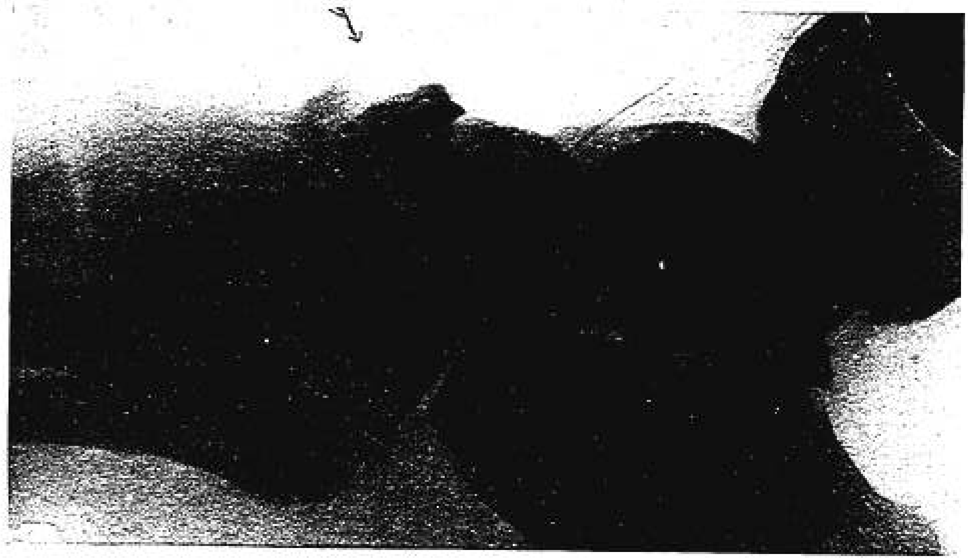
The apparatus used should have for its primary object the support of the arch. Bergmann rejects the complete cast as inapplicable on account of the swelling in early cases, and rec-

Fig. 1.



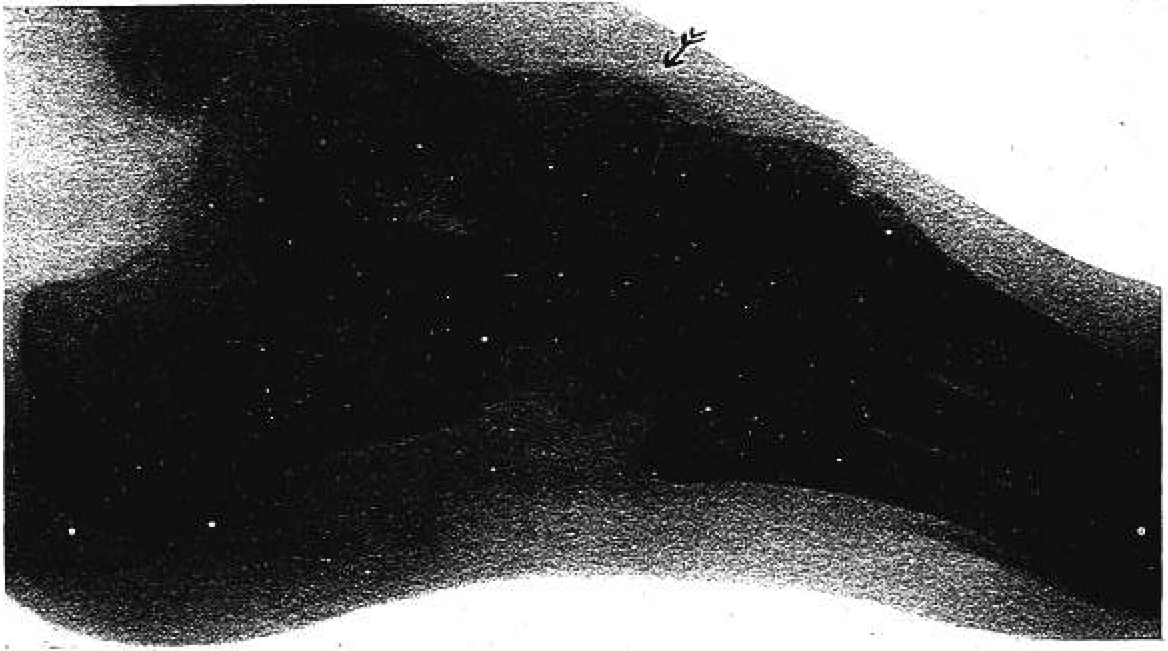
Case I.—Note forward displacement of scaphoid, and relation of astragalus.

FIG. 2.



Case II.—Note comminution and forward displacement of fragments.

FIG. 3.



Case 3.—Showing longitudinal fracture of bone.

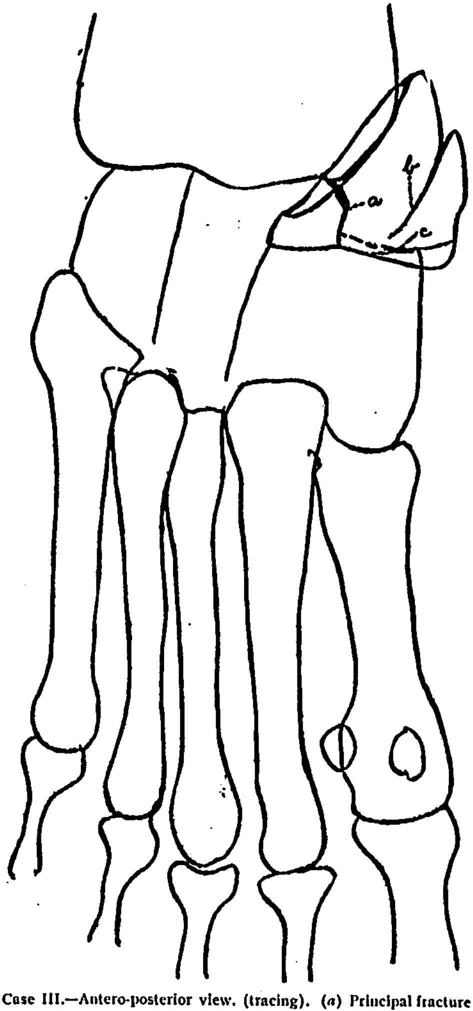
ommends a strong plantar splint of plaster, extending from the toes over the sole to the upper third of the leg, and well molded over the arch. Over this is applied a firm bandage with much wadding. This dressing allows of daily removal of the bandage for massage and bathing of the foot, a procedure which this author considers very important. After firm union has been obtained, a flat-foot plate should be worn for a long period.

Prognosis should be guarded in every case. Traumatic flat-foot, with its accompaniments of pain, edema, and varying disability, is very likely to develop. Especially in the unreduced cases the ultimate function is bad. It must be borne in mind that by this fracture the capability of two of the great weight-bearing joints of the foot, the talo-navicular and naviculo-cuneiform, is practically destroyed.

CASE I.—C. H. B., lineman, aged 30, fell from a telegraph pole in October, 1905, landing heavily on both feet. He was brought fourteen miles to the Worcester City Hospital, where, a few days later, skiagraphs were taken. These showed on the right a badly comminuted ankle-joint, tibia, fibula, and astragalus all being involved. On the left, the scaphoid was broken into several pieces and driven forward under the tendons on the dorsum of the foot, the astragalus being shoved forward to take its place. Treatment consisted in reduction and immobilization in plaster, continued six weeks. Toward the end of this time flat-foot plates were applied to both feet. On December 17 the patient left the hospital, the record stating " Motions at ankle good," and I have been unable to trace him. If this case were seen fresh to-day, I should recommend Bloodgood's operation (Fig. I.)

CASE II.—N. F., teamster, aged 23, stepped backward into a hole in a roof, and fell about 20 feet to a pile of bricks, striking on both feet with knees semi-flexed, on October 28, 1906. The left ankle at once became swollen and painful, and he was taken to the Worcester City Hospital, where swelling, ecchymosis, tenderness, and crepitus below the malleoli were noted, and a diagnosis of fractured astragalus made. A skiagraph taken next morning showed the following condition: Scaphoid comminuted with slight forward dislocation of fragments. Astragalus pushed slightly downward. (Fig. II.)

FIG. 4.



Case III.—Antero-posterior view. (tracing). (*a*) Principal fracture line. (*b*, *c*) Lines of fissure.

Plaster was applied, and continued for about four weeks, after which patient was allowed to use his foot.

On February 14, 1907, three and a half months after the injury, his condition was as follows: Marked thickening at the site of the bone on the dorsum and inner side of the foot, apparently due to callus formation. Motions at the ankle are free and painless, except inversion, which causes some pain. Patient says that the foot easily becomes tired. After a hard day's work it becomes edematous and cyanotic, and the veins become prominent. Pain appears at the site of the fracture, sometimes radiating up the leg, and severe enough to interfere considerably with his present work as collector.

A skiagraph taken at this time showed the bones about as in the first one, with some loss of detail, probably due to callus. A flat-foot plate, designed to hyper-correct the evident flattening of the arch, was applied, with immediate and continued relief. The patient is still wearing it (May 4).

Case III.—J. J., nurse, aged 21, leaped from a window in a fit of melancholia on March 4, 1907, striking with both feet on the frozen ground. She afterward complained of pain in the right foot, and a bandage was applied, but little else was done until four weeks later, when Dr. B. T. Burley was called as consultant on the nervous symptoms. He examined the foot, and, having heard cases I and II reported before a local society, made the clinical diagnosis of fractured scaphoid. By his advice the patient was sent to Memorial Hospital and skiagraphs taken (Figs. III and IV). Physical examination showed marked tenderness on the dorsum and inner side of the foot, over the site of the bone. No crepitus could be elicited.

The skiagraphs showed the longitudinal fissure line with unusual distinctness, there being also some comminution of the fragments.

A plaster cast was applied from the toes up, and worn two weeks, when it was replaced by a bandage. At the present writing (May 4) the foot appears normal, but the patient is still on crutches, and refuses to put it to the floor. The mental condition renders careful examination difficult.*

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* July 27. Patient's mental condition has improved, and she reports foot "as well as ever, except for swelling after unusual exertion." Is wearing no apparatus.

I am indebted to Drs. Homer Gage, Marsh, and Burley for the privilege of reporting these cases, which occurred on their services. The histories are compiled from the records of the Worcester City and Memorial Hospitals.

BIBLIOGRAPHY.

[1] Kohlhardt. Seltene Verletzungen der Fusswurzel.
[2] Bahr. Volkmann's Vortrage, 136.
[3] Bergmann. Deutsche Zeitscrift für Chir., 1905, lxxviii, 199.
[4] Momburg. Arch für klin. Chir., 1905, lxxvii, 295. Cited by Bloodgood in Progressive Medicine, Dec., 1906.
[5] Bloodgood. Loc. cit.